

# **Tools for Managing the Fraser River Estuary**

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## **Extended Abstract:**

### **Background**

The Fraser River Estuary Management Program (FREMP) is a partnership program for coordinated environmental management of the Fraser River estuary, one of the most significant aquatic ecosystems in the Lower Mainland of British Columbia. The six FREMP partners include federal (Environment Canada and Fisheries & Oceans Canada), provincial (Ministry of Water, Land and Air Protection), and regional governments (Greater Vancouver Regional District) and port authorities (Fraser River Port Authority and North Fraser Port Authority). The geographical scope of the FREMP area is the wetted side of the dike of the Fraser River downstream from Kanaka Creek and Pitt Lake to the Strait of Georgia, along with Sturgeon Bank, Roberts Bank and Boundary Bay. FREMP and BIEAP, the Burrard Inlet Environmental Action Program, share a two-level management structure and secretariat office in Burnaby, BC.

Established in 1985, FREMP has two main roles: policy and planning coordination through an Estuary Management Plan (FREMP, 2003) and coordinated environmental review of projects on the foreshore. The FREMP and BIEAP programs operate through Memoranda of Understanding between the partners, which establish the framework for coordination of the partner agencies.

FREMP has developed a number of tools over the years to help manage the Fraser River estuary. Key among these are the habitat inventory and classification systems, an in-house Geographical Information System (GIS), and a coordinated project review process. In 2003, FREMP also adopted an Ecological Features and Functions Approach to management, including as the basis for updating its habitat inventory and classification systems.

### **Habitat Inventory**

The FREMP habitat inventory provides information on the habitat features of the estuary. First mapped in the 1980s, the inventory was updated in 2003 to reflect changes in habitat values due to the highly dynamic nature of the estuary. The five FREMP habitat types were re-mapped: intertidal marsh, mudflat, sandflat, riparian grasses and shrubs, and riparian trees. The inventory was also updated using a "features and functions" approach to capture more information on upland structures like bank condition and structures. The goal of this approach is to reveal and protect the underlying needs within a system (e.g., tall trees for bird nesting, deep water for ship moorage).

The process for updating the habitat inventory used a novel technology. Air photos were taken of the entire FREMP area near low tide on April 29, 2002. These images were then transformed into digital air photos for use with a specialized 3-D viewer. The ISM DiAP (Diapositive softcopy) viewer is a digital stereo viewer that allows users to interpret and digitize 3-D features directly onto their maps. This combination of specialized hardware and software allows an air photo interpreter to accurately identify habitat types. Using the viewer, polygons (homogenous habitat units) were mapped or geo-referenced and then converted into GIS format. Each polygon was assigned a unique number and assigned categories according to the following system:

- The first level of the system assigns each polygon as either Riparian (upland) or Tidal.
- The second level describes the type of vegetation present.
- The third level describes the type of species, and
- The fourth level lists the dominant species whenever they could be determined with confidence.

For example, a forest along the banks of the Fraser River could be delineated as Riparian, Trees, Deciduous, *Acer macrophyllum*. This information was all recorded in an Access database connected with the mapped polygons. The database also contains several additional fields for each polygon that provide information relating to municipality, zoning, and other characteristics. The database has been designed to

accommodate additional information collected during future ground surveys, including rare species, introduced species, bank type, etc.

Initially, all habitat polygons greater than 15m<sup>2</sup> were mapped and classified ("fine scale" mapping). However, due to the highly fragmented nature of the estuary and available project resources, the minimum polygon size was later increased to areas greater than 50m<sup>2</sup> and the number of fields in the classification system reduced ("coarse scale" mapping). A total of 2262 polygons were digitized and classified at the fine scale, and 8372 at the coarse scale, providing an exceptional coverage of habitat data for the Fraser River estuary. The polygons were then converted into ESRI ArcView GIS format. The GIS polygons and Access database have been made available to the public through CD and the FREMP FTP site, and is viewable on-line in the FREMP Atlas discussed later.

### **Habitat Classification (Colour Code) System**

The FREMP habitat classification system assigns colour-codes (red, yellow or green) to intertidal and riparian areas on the basis of the relative values of their habitat features. The classification system is based on the habitat inventory, and is intended to guide prospective developers in selecting appropriate sites and design concepts prior to seeking approval of their projects. Such approvals are obtained through application to the appropriate Lead Agency and subsequent review through the FREMP Coordinated Project Review Process (see below).

Red coded habitats include productive and diverse habitat features that support critical fish and wildlife functions on-site or as part of a more regional context and/or areas where habitat compensation has been previously constructed to offset habitat losses. Yellow coded habitats include habitat features that are of moderate value in structure or diversity, and green coded habitats include areas where features and functions are limited due to existing conditions (e.g., developed for port or other urbanized uses).

The classifications were updated in 2005 based on the updated habitat inventory and revised colour code definitions agreed to by the FREMP partners (FREMP, 2005). While a process is in place at FREMP to respond to specific habitat reclassification requests, natural changes along the river need to be captured from time to time through a broader review of the FREMP habitat classifications. This was the purpose of the review in 2004-2005. An inter-agency review of the entire estuary shoreline included boat reconnaissance where GPS technology recorded that boat's location relative to each shoreline segment. The review of the coding led to a number of classification updates which have now been finalized.

### **Coordinated Project Review Process & Project Files**

A key component of the FREMP partnership's efforts to coordinate environmental management of the Fraser River estuary, is the review of proposals for shoreline development and other activities in these marine ecosystems. Known as the Coordinated Project Review Process, the partners collectively review proposals before a federal, provincial or municipal authority makes any decision that would allow the project to proceed. There is a three-phase, four-track process for project review.

It is important to note that the coordinated project review process does not issue project approvals. Instead, it provides the responsible authorities and the proponent with mitigation recommendations prior to making a decision about approving the project. Track 2 reviews (the most commonly reviewed by the FREMP ERC) are usually completed within a 30-business daytime frame, depending on the complexity of the project.

The FREMP website contains Project Files, which provide a quick reference to what stage an application has reached in the FREMP Project Review Process for Track 2 projects. Updated weekly, the Project Files identify the Lead Agency, the date referral comments were solicited, the deadline for comments and the status of the application. The Project Files are kept as a Public Registry.

### **On-Line FREMP Atlas**

The FREMP inventory and classification datasets are available to the public in a web-based atlas on the Community Mapping Network ([www.shim.bc.ca](http://www.shim.bc.ca)). Working with the Community Mapping Network staff,

a FREMP Atlas was created that includes the 2002 orthophotos, 2003 habitat inventory, and updated habitat classifications. Other information layers are also available, including habitat compensation sites along the estuary. The Atlas allows developers, municipal staff and members of the public to review and print maps from the Internet. Making the FREMP information more accessible facilitates better decision-making on projects in the estuary.

## **References**

Fraser River Estuary Management Program, 2003. *A Living, Working River: The Estuary Management Plan for the Fraser River, 2003*. Burnaby, BC. 88pp.

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Fraser River Estuary Management Program, 2005. *Updating the FREMP Habitat Classifications, February 2005*. Burnaby, BC.